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Biostratigraphical investigations as a tool for palaeoenvironmental reconstruction of the Neopleistocene (Middle-Upper Pleistocene) at Kosika, Lower Volga, Russia

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ABSTRACT

The Kosika locality is situated on the lowest terrace of the Enotayevka River (right channel of the Volga River) near Kosika village, in the Astrakhan region of the Russian Federation. This locality includes several sections, named Kosika 1–4 and Borehole 2 Kosika that are described in detail for the first time. Drilling, sediment descriptions, and sampling were performed during the 2008–2015 field seasons. Application of complex biostratigraphical methods and optically stimulated luminescence (OSL) dates were used to reconstruct the Neopleistocene (Middle-Late Pleistocene) palaeoenvironment in the Lower Volga area.

During the Tyurkyan Period (at the early beginning of the Neopleistocene), regression of the Apsheronian Sea began. Lithological features and the presence of freshwater molluscs demonstrate that deposits accumulated in rivers and lakes under humid climatic conditions. Molluscs, ostracods, and dinoflagellates inhabited the Baku Sea. Climate was arid at the beginning of this period and humid during a later phase. Several changes affecting the marine and fluvial environments characterise the Early Khazar period. In particular, the climate oscillated from humid conditions at the beginning to an arid state, then returned to a more humid setting at the end of this period. These changes are indicated by palynological and malacological data. Regression of the Early Khazar Sea occurred during Singil time, when rivers, lakes, and limans (lagoons) existed. Large mammals inhabited plains that were covered by extensive vegetation. The climate during this period was humid and slightly cooler than the present day climate. Late Khazar and Khvalyn transgressions occurred during the Late Neopleistocene. When the Late Khazar Sea retreated from the territory, river valleys became the dominant landscape feature. Floodplains of Late Khazar rivers became sites of deposition of loamy and sandy material emplaced during flood events. At the end of this regressive period, the climate was arid and dry enough to allow for accumulation of anhydrite sediment in shallow lagoons and lakes. Afterwards, the Khvalyn transgression began, as indicated by the occurrence of specific key mollusc species. Fluvial-marine deposits formed geological bodies representative of an undersea delta, which in relief form the Baer Knolls. The modern Volga valley was formed during the Holocene.

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